

Final
Environmental Impact Statement
Related to Reclamation of the
Uranium Mill Tailings at the
Atlas Site, Moab, Utah

Source Material License No. SUA 917
Docket No. 40-3453
Atlas Corporation

U.S. Nuclear Regulatory Commission

Office of Nuclear Material Safety and Safeguards

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ABSTRACT

This Final Environmental Impact Statement (FEIS) has been prepared by the Nuclear Regulatory Commission (NRC), Office of Nuclear Material Safety and Safeguards, to address potential environmental impacts associated with a request by Atlas Corporation to amend its existing NRC License No. SUA-917 to reclaim in place an existing uranium mill tailings pile near Moab, Utah. The proposed reclamation would allow Atlas to (1) reclaim the tailings pile for permanent disposal and long-term custodial care by a government agency in its current location on the Moab site, and (2) prepare the 162-ha (400-acre) Moab site for site closure. The FEIS describes and evaluates (1) the purpose of and need for the proposed action, (2) alternatives considered, (3) potentially affected environmental resources, (4) environmental consequences of the proposed action, and (5) costs and benefits associated with reclamation alternatives.

The National Park Service (NPS), U.S. Department of the Interior, was a cooperating agency in the preparation of this FEIS. In this role, the NPS provided information to the preparers of the FEIS, submitted comments on preliminary drafts of the EIS, and assisted in defining proposed sampling protocols for the collection of additional information on water quality and aquatic biota. The NPS does not necessarily agree with the analysis and conclusions in this FEIS.

A Draft Environmental Impact Statement (DEIS) on the proposed reclamation was published for public and agency comment in January 1996. A public meeting was held in Moab on February 28, 1996, to receive comments on the DEIS. The comment period closed on April 29, 1996. This FEIS incorporates revisions in response to comments received. A summary of the comments on the DEIS and responses to comments are presented in Appendix A. The comment letters received are reproduced in Appendix J.

After an extensive consultation process under Section 7 of the Endangered Species Act, in July 1998 the U.S. Fish and Wildlife Service (FWS) issued their Final Biological Opinion on the impacts of the proposed project to endangered and threatened species. The Final Biological Opinion concluded that the proposed project would jeopardize the continued existence of four endangered fish species due to continued leaching of contaminants into the Colorado River, water depletion impacts, and/or destruction or adverse modification of designated habitat. The FWS included reasonable and prudent alternatives to avoid the likelihood of jeopardy to the endangered fishes and to avoid destruction or adverse modification of their critical habitat, as well as reasonable and prudent measures to minimize the incidental take of southwestern willow flycatcher, razorback sucker, and Colorado squawfish. These requirements would be included in any license amendment approved by NRC on the proposed reclamation plan.

The analysis of impacts presented in the FEIS indicates that the Atlas proposed on-site reclamation with recommended mitigation will significantly reduce the impact of contaminants

entering the Colorado River, but a rigorous determination of whether the proposed action will meet the FWS ammonia concentration requirements specified in the Final Biological Opinion cannot be made without additional data and analyses by the applicant. All other environmental aspects of the proposed action are acceptable. The FEIS compares the proposed on-site reclamation to an alternative of moving the tailings to an alternative site on Klondike Flat. NRC staff's analysis finds that no aspect of the relocation alternative would have a potentially significant, adverse, long-term environmental or socioeconomic impact. Some of the short-term impacts, including radiation doses associated with moving the tailings, would be greater for the relocation alternative. Thus, the short-term impacts and the significantly higher economic cost of moving the tailings are the major disadvantages of the relocation alternative

CONTENTS

ABSTRACT	iii
FOREWORD	xvii
ACKNOWLEDGEMENTS	xix
ACRONYMS AND ABBREVIATIONS	xxi
SUMMARY AND CONCLUSIONS	xxv
1. PURPOSE OF AND NEED FOR ACTION	1-1
1.1 INTRODUCTION	1-1
1.1.1 The Federal Proposed Action	1-1
1.1.2 The Atlas Proposal	1-2
1.1.3 Alternatives	1-2
1.1.4 Overview of Uranium Mill Tailings Hazards	1-4
1.2 PURPOSE OF AND NEED FOR ACTION	1-6
1.3 HISTORY AND CURRENT STATUS OF THE MOAB MILL FACILITY AND OPERATIONS	1-7
1.4 FEDERAL AND STATE AUTHORITIES, REGULATIONS, AND PERMITS	1-10
1.5 RESULTS OF SCOPING AND COMMENTS ON THE DRAFT EIS	1-11
1.5.1 The Scoping Process and Results	1-11
1.5.2 Comments on DEIS	1-13
1.5.3 Scope of the EIS	1-14
2. ALTERNATIVES INCLUDING THE PROPOSED ACTION	2-1
2.1 THE ATLAS CORPORATION PROPOSAL	2-1
2.1.1 Overview	2-1
2.1.2 Proposed Tailings Disposal on the Atlas Site	2-1
2.1.2.1 Final Structure and Characteristics of the Reclaimed Tailings Pile	2-1
2.1.2.2 On-Site Construction and Operations During the Reclamation Process	2-11
2.1.2.3 Monitoring and Maintenance of the Tailings Pile	2-11

2.1.3	Borrow Areas and Transport of Borrow Materials	2-12
2.1.4	Schedules for Reclamation and Employment	2-14
2.1.5	Natural Resource Requirements	2-14

CONTENTS (continued)

2.1.6	Emissions, Discharges, and Solid Wastes	2-14
2.1.7	Mitigation	2-15
2.1.8	Possible Accidents	2-15
2.2	DISPOSAL AND RECLAMATION AT AN ALTERNATE SITE	2-16
2.2.1	Plateau Site	2-17
2.2.1.1	Overview	2-17
2.2.1.2	Alternative Modes of Tailings Transport	2-19
2.2.1.3	Tailings Disposal	2-21
2.2.1.4	Borrow Areas and Transport of Borrow Materials	2-22
2.2.1.5	Final Disposition of the Moab Site	2-22
2.2.1.6	Post-Reclamation Activities, Monitoring, and Surveillance	2-24
2.2.1.7	Schedule for Reclamation and Employment	2-24
2.2.1.8	Natural Resource Requirements	2-25
2.2.1.9	Emissions, Discharges, and Solid Wastes	2-25
2.2.1.10	Mitigation	2-25
2.2.1.11	Possible Accidents	2-25
2.2.2	Other Alternate Sites	2-26
2.3	THE NO-ACTION ALTERNATIVE	2-27
2.4	COMPARISON OF THE IMPACTS OF ALTERNATIVES	2-28
3.	THE AFFECTED ENVIRONMENT	3-1
3.1	METEOROLOGY, AIR QUALITY, AND VISIBILITY	3-1
3.1.1	Meteorology and Climate	3-1
3.1.2	Air Quality	3-2
3.1.2.1	Ambient Air Quality and Visibility	3-2
3.1.2.2	Prevention of Significant Deterioration	3-3
3.2	GEOLOGY, SOILS, AND SEISMICITY	3-5
3.2.1	Structural Geology	3-5
3.2.2	Soils	3-7
3.2.3	Seismicity	3-10
3.2.4	Mineral Resources	3-10
3.3	LAND USE	3-10
3.4	GROUNDWATER	3-13
3.4.1	Groundwater Resources and Hydrology	3-13
3.4.1.1	Stratigraphy	3-13
3.4.1.2	Groundwater Hydrology	3-14
3.4.2	Groundwater Quality	3-16
3.4.3	Groundwater Use	3-17
3.5	SURFACE WATER	3-18

3.5.1	Surface Water Bodies, Hydrology, and Floodplains	3-18
3.5.1.1	Water Bodies and Hydrology	3-18
3.5.1.2	Floods and Floodplains	3-20

CONTENTS (continued)

3.5.1.3	Low Flows	3-21
3.5.2	Surface Water Quality	3-21
3.5.3	Surface Water Use	3-22
3.6	ECOLOGY	3-23
3.6.1	Aquatic Ecology	3-23
3.6.2	Terrestrial Ecology	3-23
3.6.2.1	Vegetation	3-23
3.6.2.2	Wildlife	3-25
3.6.3	Wetlands	3-25
3.6.4	Threatened and Endangered Species	3-26
3.6.4.1	Aquatic Species	3-26
3.6.4.2	Terrestrial Species	3-28
3.7	SOCIOECONOMIC, CULTURAL, AND AESTHETIC RESOURCES	3-28
3.7.1	Population	3-28
3.7.2	Economic Resources and Employment	3-30
3.7.2.1	Economic Resources	3-30
3.7.2.2	Employment	3-31
3.7.3	Recreation	3-32
3.7.4	Aesthetics	3-35
3.7.5	Public Services and Infrastructure	3-36
3.7.6	Historic and Cultural Resources	3-37
3.8	NATURAL RADIATION ENVIRONMENT	3-39
4.	ENVIRONMENTAL CONSEQUENCES, MONITORING, AND MITIGATION ..	4-1
4.1	AIR QUALITY AND NOISE	4-1
4.1.1	Reclamation Impacts at the Atlas and Plateau Sites	4-1
4.1.2	Borrow Operations	4-4
4.1.3	Tailings Transport	4-5
4.1.4	Accidents	4-5
4.1.5	Monitoring and Mitigation	4-6
4.1.6	Post-Reclamation Impacts	4-6
4.1.6.1	Normal Conditions	4-6
4.1.6.2	Tailings Pile Failure	4-6
4.1.7	Conclusion	4-6
4.2	GEOLOGY, SOILS, AND SEISMICITY	4-7
4.3	LAND USE	4-7
4.3.1	Reclamation Impacts at the Atlas and Plateau Sites	4-7
4.3.2	Borrow Operations	4-8
4.3.3	Tailings Transport	4-8

4.3.4	Accidents	4-9
4.3.5	Monitoring and Mitigation	4-9
4.3.6	Post-Reclamation Impacts	4-9

CONTENTS (continued)

4.3.6.1	Normal Conditions	4-9
4.3.6.2	Tailings Pile Failure	4-9
4.3.7	Conclusion	4-11
4.4	GROUNDWATER	4-11
4.4.1	Reclamation Impacts at the Atlas and Plateau Sites	4-11
4.4.2	Borrow Operations	4-12
4.4.3	Tailings Transport	4-12
4.4.4	Accidents	4-13
4.4.5	Post-Reclamation Impacts	4-13
4.4.5.1	Estimates of Contaminant Transport	4-15
4.4.5.2	Tailings Pile Failure	4-25
4.4.6	Monitoring and Mitigation	4-25
4.4.7	Conclusion	4-27
4.5	SURFACE WATER	4-28
4.5.1	Surface Water Hydrology and Floodplains	4-28
4.5.1.1	Reclamation Impacts at the Atlas and Plateau Sites	4-28
4.5.1.2	Borrow Operations	4-29
4.5.1.3	Tailings Transport	4-29
4.5.1.4	Accidents	4-29
4.5.1.5	Monitoring	4-29
4.5.1.6	Post-Reclamation Impacts	4-29
4.5.1.7	Conclusion	4-30
4.5.2	Surface Water Quality	4-30
4.5.2.1	Effects of the Pile Under Existing Conditions	4-30
4.5.2.2	Construction Impacts of Reclamation	4-52
4.5.2.3	Tailings Transport	4-54
4.5.2.4	Post-Reclamation Impacts	4-55
4.5.2.5	Tailings Pile Failure	4-57
4.5.2.6	Monitoring and Mitigation	4-60
4.5.2.7	Conclusion	4-61
4.5.3	Surface Water Use	4-62
4.6	ECOLOGY	4-63
4.6.1	Aquatic Ecology	4-63
4.6.1.1	Construction Impacts of Reclamation	4-63
4.6.1.2	Post-Reclamation Impacts	4-64
4.6.1.2.1	Normal Conditions	4-64
4.6.1.2.2	Tailings Pile Failure	4-83
4.6.1.2.3	Monitoring and Mitigation	4-85
4.6.1.2.4	Conclusions	4-85

4.6.2	Terrestrial Ecology	4-86
4.6.2.1	Reclamation Impacts at the Atlas and Plateau Sites	4-86
4.6.2.2	Borrow Operations	4-87

CONTENTS (continued)

4.6.2.3	Tailings Transport	4-87
4.6.2.4	Accidents	4-87
4.6.2.5	Monitoring and Mitigation	4-87
4.6.2.6	Post-Reclamation Impacts	4-88
4.6.3	Wetlands and Floodplains	4-88
4.6.3.1	Reclamation Impacts	4-88
4.6.3.2	Impacts from Relocation of Moab Wash	4-89
4.6.3.3	Post-Reclamation Impacts	4-90
4.6.4	Threatened and Endangered Species	4-90
4.6.4.1	Reclamation Impacts	4-90
4.6.4.2	Post-Reclamation Impacts	4-93
4.6.5	Conclusion	4-95
4.6.5.1	Aquatic Ecology, Including Threatened and Endangered Fish Species	4-95
4.6.5.2	Terrestrial Ecology, Including Threatened and Endangered Species	4-96
4.6.5.3	Wetlands	4-96
4.7	SOCIOECONOMIC, CULTURAL, AND AESTHETIC RESOURCES	4-97
4.7.1	Population	4-97
4.7.1.1	Reclamation Impacts	4-97
4.7.1.2	Borrow Operations	4-97
4.7.1.3	Tailings Transport	4-97
4.7.1.4	Accidents	4-97
4.7.1.5	Post-Reclamation Impacts	4-99
4.7.1.6	Conclusion	4-100
4.7.2	Economic Resources and Employment	4-101
4.7.2.1	Reclamation Impacts	4-101
4.7.2.2	Borrow Operations	4-102
4.7.2.3	Accidents	4-102
4.7.2.4	Post-Reclamation Impacts	4-102
4.7.2.5	Conclusion	4-104
4.7.3	Recreation	4-104
4.7.3.1	Reclamation Impacts	4-104
4.7.3.2	Borrow Operations	4-104
4.7.3.3	Tailings Transport	4-105
4.7.3.4	Accidents	4-106
4.7.3.5	Post-Reclamation Impacts	4-106
4.7.3.6	Conclusion	4-106
4.7.4	Aesthetics	4-107

4.7.4.1	Reclamation Impacts	4-107
4.7.4.2	Post-Reclamation Impacts	4-107
4.7.4.3	Conclusion	4-108

CONTENTS (continued)

4.7.5	Public Services and Infrastructure	4-109
4.7.5.1	Reclamation Impacts	4-109
4.7.5.2	Borrow Operations	4-109
4.7.5.3	Tailings Transport	4-109
4.7.5.4	Accidents	4-109
4.7.5.5	Post-Reclamation Impacts	4-110
4.7.5.6	Monitoring and Mitigation	4-110
4.7.5.7	Conclusion	4-110
4.7.6	Historic and Cultural Resources	4-110
4.7.7	Environmental Justice	4-111
4.7.7.1	Background and Method	4-111
4.7.7.2	Analysis	4-112
4.8	RADIOLOGICAL IMPACTS	4-117
4.8.1	Impacts of the Atlas Proposal	4-117
4.8.1.1	Methodology and Approach	4-118
4.8.1.2	Estimated Releases	4-119
4.8.1.3	Exposure Pathways, Doses and Risks	4-120
4.8.1.4	Impacts to the Maximally Exposed Individual	4-120
4.8.1.5	Impacts to the Surrounding Population	4-126
4.8.1.6	Occupational Dose Associated with the Atlas Proposal ..	4-127
4.8.1.7	Radiological Monitoring Program	4-128
4.8.1.8	Evaluation of Radiological Impacts for the Atlas Proposal	4-131
4.8.2	Radiological Impacts of the Plateau Site Alternative	4-132
4.8.2.1	Impacts at the Atlas Moab Site	4-132
4.8.2.2	Impacts to the Maximally Exposed Individual	4-133
4.8.2.3	Impacts to the Surrounding Population	4-133
4.8.2.4	Occupational Dose	4-133
4.8.3	Risk Assessment for Tailings Transport	4-134
4.8.3.1	Mill Tailings Transportation	4-134
4.8.3.2	Characteristics of the Tailings	4-134
4.8.3.3	Radiological Health Effects	4-134
4.8.4	Hazards Analysis	4-138
4.9	CUMULATIVE IMPACTS	4-139
4.9.1	Air Quality	4-140
4.9.2	Geology	4-140
4.9.3	Land Use	4-140
4.9.4	Groundwater	4-140
4.9.5	Surface Water	4-141

4.9.6	Ecological Resources	4-142
4.9.7	Socioeconomic, Population, and Cultural Resources	4-142
4.9.8	Radiation	4-143

CONTENTS (continued)

4.10	UNAVOIDABLE ADVERSE ENVIRONMENTAL IMPACTS	4-143
4.10.1	Air Quality	4-143
4.10.2	Soils	4-143
4.10.3	Land Use	4-143
4.10.4	Mineral Resources	4-144
4.10.5	Groundwater	4-144
4.10.6	Surface Water	4-144
4.10.7	Ecological Resources	4-144
4.10.8	Socioeconomic, Cultural, and Aesthetic Resources	4-145
4.10.9	Radiation	4-145
4.11	RELATIONSHIP BETWEEN SHORT-TERM USES OF THE ENVIRONMENT AND LONG-TERM PRODUCTIVITY	4-145
4.12	IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES	4-146
5.	COST AND BENEFITS ASSOCIATED WITH RECLAMATION ALTERNATIVES	5-1
5.1	INTRODUCTION	5-1
5.2	ESTIMATES OF COSTS PROVIDED BY ATLAS	5-1
5.3	COMPARISON OF COSTS	5-8
5.3.1	Project Requirements	5-8
5.3.2	Comparison and Evaluation of Unit Cost Assumptions	5-8
5.3.3	Comparison of Selected Costs	5-14
5.3.3.1	Clay Cap and Liner	5-14
5.3.3.2	Excavation	5-14
5.3.3.3	Transport Cost	5-15
5.3.3.4	Rail Spur Cost	5-15
5.3.3.5	Off-Load and Placement of Tailings at the Plateau Site ...	5-15
5.3.3.6	Cost of Rock Material and Hauling	5-15
5.3.3.7	Analysis of Above-Grade Versus Below-Grade Costs	5-18
5.3.3.8	The Potential for Cost Savings by Using Large Mine-Haul Trucks to Transport the Tailings	5-18
5.3.3.9	Dewatering	5-19
5.3.3.10	Groundwater Cleanup Costs and Benefits of Using the Existing Site After Tailings Removal	5-19
5.4	THE EFFECT OF DISCOUNTING TOTAL PROJECT COSTS	5-20
5.5	EVALUATION OF LARGE OFF-HIGHWAY MINE-HAUL TRUCKS FOR TRANSPORT TO PLATEAU SITE	5-21
5.5.1	Truck Haul Costs	5-21

5.5.2	Truck Haul Savings	5-23
5.5.3	Potential Net Savings and Conclusion	5-23
5.6	CONCLUSION	5-25

CONTENTS (continued)

5.7 BENEFIT COST SUMMARY	5-27
6. REFERENCES	6-1
7. LIST OF PREPARERS	7-1
APPENDIX A: RESPONSE TO COMMENTS ON THE DRAFT ENVIRONMENTAL IMPACT STATEMENT	A-1
APPENDIX B: BIOLOGICAL ASSESSMENT AND SUPPLEMENT TO BIOLOGICAL ASSESSMENT	B-1
APPENDIX C: FINAL BIOLOGICAL OPINION	C-1
APPENDIX D: ADDITIONAL INFORMATION ON CHARACTERISTICS OF URANIUM MILL TAILINGS PILES	D-1
APPENDIX E: PRINCIPAL DOCUMENTS SUPPORTING THE ATLAS CORPORATION'S SOURCE MATERIAL LICENSE SUA-917	E-1
APPENDIX F: RESULTS OF THE SCOPING PROCESS	F-1
APPENDIX G: LETTER FROM ENVIRONMENTAL PROTECTION AGENCY CONCERNING IMPACTS ON SCOTT MATHESON WETLANDS PRESERVE .	G-1
APPENDIX H: CONSULTATION LETTERS RECEIVED FROM AGENCIES	H-1
APPENDIX I: ENVIRONMENTAL JUSTICE DATA	I-1
APPENDIX J (VOLUME 2):	J-1

FIGURES

<u>Figure</u>	<u>Page</u>
1.1-1	Regional Location of the Atlas Corporation Site near Moab, Utah 1-3
2.1-1	The Atlas Corporation Site and Uranium Mill Tailings Pile at Moab, Utah 2-2
2.1-2	Proposed Surface Structure and Drainage for the Reclaimed Tailings Pile 2-3
2.1-3	Proposed Interior Structure of the Reclaimed Tailings Pile 2-5
2.2-1	Location of the Plateau Alternate Site for Disposal of the Atlas Corporation Uranium Mill Tailings at Moab, Utah 2-18
2.2-2	Conceptual Design of the Tailings Pile at an Alternate Site 2-23
3.2-1	Representative Salt Anticlines, Precambrian/Paleozoic Faults and Lineaments in the Paradox Basin of Utah and Colorado 3-6
3.2-2	The Moab Fault 3-8
3.2-3	Geologic Section and Stratigraphic Columns in Moab Wash in the Region of the Atlas Tailings Pile at Moab, Utah 3-9
3.3-1	Land Use in the Vicinity of the Atlas Corporation Site, Moab, Utah 3-12
3.4-1	Groundwater Flow in the Quaternary Aquifer Beneath the Atlas Corporation Site, Moab, Utah 3-15
3.7-1	Annual Average Unemployment in Utah and Grand County, 1970–1992 3-33
3.7-2	Growth in Annual Visits to Arches National Park, 1946–1993 3-35
4.4-1	Conceptual Diagram of Seepage and Groundwater Flow 4-16
4.4-2	Conceptual Diagram of the Development of the Groundwater Contaminant Plume 4-18
4.4-3	Changes in Total Dissolved Solids Concentrations in Piezometer ATP-2-S Over the Period 1982—1994 4-19
4.4-4	Changes in Uranium Concentrations in Piezometer ATP-2 Over the Period 1982—1993 4-19
4.4-5	Location of Current Groundwater Monitoring Wells 4-26
4.7-1	Census Block Groups and Blocks Identified by Number and Location in Moab and the Immediate Vicinity 4-114
4.8-1	Locations of Monitoring Stations for the Atlas Radiological Monitoring Program 4-130

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TABLES

<u>Table</u>	<u>Page</u>
1.4-1	Applicable Permits, Licenses, and Approvals
2.1-1	The Proposed Cover Profile Over Coarse Tailings, Fine Tailings, and Embankments
2.1-2	Riprap Sizes and Thickness
2.1-3	Chemical Composition of Tailings Liquid at the Atlas Site, Moab, Utah
2.1-4	Analytical Results for Metals Analyses in Soil from PB-1 and PB-2
2.1-5	Comparison of Truck Hauling of Borrow Materials under the Atlas Proposal and the Plateau Site Alternative
2.4-1	Summary Comparison of the Impacts of the Atlas Proposal and the Plateau Site Alternative
3.1-1	Expected Precipitation Extremes at Moab, Utah, for Selected Lengths of Time and Return Periods
3.1-2	Air Quality Standards
3.1-3	Air Quality in the Moab Region
3.6-1	Fish that Occur or May Occur in the Colorado River near the Tailings Pile
3.7-1	Population Growth in Moab and Grand County, Utah, 1970–1992
3.7-2	1990 Population by Self-Reported Racial Category for the State of Utah, Grand County, and San Juan County
3.7-3	Land Ownership in Grand County
3.7-4	Labor Market, Annual Average, 1992
3.8-1	Annual U.S. Population Average Total Effective Dose Equivalent from Man-Made and Natural Radiation Sources
4.4-1	Comparison of Groundwater at the Atlas Site with Federal Drinking Water Standards
4.5-1	Comparison of Water Quality of the Colorado River Upstream and Downstream of the Tailings Pile
4.5-2	Concentrations of Selected Chemicals in Colorado River and Seep Water
4.5-3	Concentrations of Selected Radionuclides in Colorado River and Pile Seep Water
4.5-4	Mean Sediment Dry Weight Concentrations Upstream and Downstream of the Atlas Tailings Pile Compared to Published Mean Background Concentrations

	for U.S. Soils	4-42
4.5-5	Mean Concentrations of Dissolved Contaminants in Tailings Solutions Removed from the Tailings Pile Dewatering Well from 1990 to 1996	4-43
4.5-6	Mean Concentrations of Selected Tailings Contaminants in Groundwater and Contaminant Contribution to the Colorado River Following Complete Dilution at Average (7770 cfs) and Minimum (558 cfs) River Flows	4-44

TABLES (continued)

4.5-7	Comparison of Mean, Post-Dilution, Dissolved Contaminant Contributions from Erosion of 20 percent of the Tailings Pile into the Colorado River during a Probable Maximum Flood (averaging 150,000 cfs for 10 hours) with Ambient Conditions, Standards and Benchmarks	4-58
4.6-1	Contributions of Tailings Leachates to the Colorado River during Mean and Low River Flows, as Compared with Ambient Concentrations, Water Quality Standards, and Toxicity Benchmarks	4-66
4.6-2	Estimated Internal Radiological Dose to Fish in the Colorado River Assuming Record Minimum Flow (558 cfs)	4-77
4.6-3	Internal Dose to Fathead Minnows Collected May 1995 at Station 4 Located at the Mouth of Moab Wash next to Tailings Pile	4-80
4.6-4	Estimated Internal Radiological Dose to Aquatic Biota Exposed to Dissolved Contaminants in the Colorado River after a Tailings Pile Failure	4-84
4.7-1	Comparison of Truck Traffic Through Moab from Hauling Borrow Materials under the Atlas Proposal and the Plateau Site Alternative	4-100
4.7-2	Census Blocks and Block Groups of Potential Environmental Justice Concern	4-113
4.7-3	Persons in the Various Study Areas with Incomes Below the Poverty Level .	4-116
4.8-1	Principle Parameters and Conditions Used in the Radiological Assessment of the Atlas Tailings Site	4-121
4.8-2	Average Annual Emission Estimates for the Atlas Tailings Pile	4-122
4.8-3	Estimated Impacts of Particulate Releases on the Maximally Exposed Individual Based on Computer Modeling with CAP88-PC	4-123
4.8-4	Radon Concentrations in Working Levels at Various Distances and Directions from the Atlas Tailings Pile	4-125
4.8-5	Radiological Monitoring Program	4-129
4.8-6	Comparison of Doses to the Maximally Exposed Individual to 10 CFR Part 20 Limits	4-132
4.8-7	RADTRAN-4 Assumptions for the Radiological Risk Assessment of Tailings Transport by Rail from the Atlas Site to the Plateau Site	4-135
4.8-8	Summary of the Radiological Transportation Risk Assessment for the Atlas Mill Tailings	4-137
5.2-1	Atlas 1993 Cost Estimate for Reclaiming the Tailings Pile in Place	5-2
5.2-2	Atlas 1993 Cost Estimate for Relocating Tailings to the Plateau Site	5-4
5.2-3	Atlas Revised Cost Estimate for Relocating Tailings to the Plateau Site	5-6
5.3-1	Comparison of Selected Quantities and Acts Required for Alternatives	5-9
5.3-2	Comparison of Atlas Unit Costs with Other Cost Data	5-10
5.3-3	Comparison of Key Cost Estimates	5-12
5.5-1	Assumptions and Calculation of Unit Cost for Mine-Haul Truck Tailings Transport to Plateau Site	5-22

5.5-2	Calculation of Mine Truck Haul Costs and Comparison to Costs Avoided . . .	5-24
5.6-1	Summary of Present Value of Total Alternative Cost Estimates Including Profit, Overhead, and Contingency	5-27
5.7-1	Benefit Cost Comparison of the Atlas Proposal and Plateau Site Alternative .	5-28

FOREWORD

This Final Environmental Impact Statement (FEIS) addresses the administrative action and potential environmental consequences of authorizing Atlas Corporation to reclaim an existing uranium mill tailings pile on Atlas property near Moab, Utah. Atlas would conduct reclamation activities in compliance with an amendment to its existing License No. SUA-917 issued by the U.S. Nuclear Regulatory Commission (NRC). Questions concerning this FEIS should be sent to:

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Division of Waste Management
Office of Nuclear Material Safety and Safeguards
Mail Stop TWFN 7J-9
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This Final Environmental Impact Statement (FEIS) has been prepared by the U.S. Nuclear Regulatory Commission (NRC), Office of Nuclear Material Safety and Safeguards with the assistance of Oak Ridge National Laboratory. The National Park Service (NPS), U.S. Department of the Interior, has been a cooperating agency in the preparation of this FEIS. In this role, the NPS provided information to the preparers of the FEIS, submitted comments on preliminary drafts of the EIS, and assisted in defining proposed sampling protocols for the collection of additional information on water quality and aquatic biota. The NPS does not necessarily agree with the analysis and conclusions in this FEIS. The Bureau of Land Management, U.S. Department of the Interior, which had originally been identified as a cooperating agency, withdrew because of a lack of a defined role in the project. In preparing an independent analysis for this FEIS, the staff used information provided by Atlas Corporation in its application for license amendment, federal, state, and local government agencies, and other individuals and organizations who had special knowledge of environmental resources and related activities relevant to the proposed action.

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ACRONYMS AND ABBREVIATIONS

AADT	annual average daily traffic
ACL	alternate concentration limit
ag/L	attograms per liter
ALARA	as low as reasonably achievable
amsl	above mean sea level
Atlas	Atlas Corporation
ATV	all terrain vehicle
BA	Biological Assessment
BLM	Bureau of Land Management
Bq	Becquerel
Bq/g	Becquerel per gram
Bq/m ² /s	Becquerel per square meter per second
EC	degrees Celsius
CAP	corrective action plan
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
cfs	cubic feet per second
Ci	curies
cm	centimeter
CO	carbon monoxide
dB(A)	decibels on the A-weighted scale
DEIS	draft environmental impact statement
DEQ	Department of Environmental Quality
DOE	U.S. Department of Energy
DOI	Department of the Interior
EA	environmental assessment
EIS	environmental impact statement
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
EF	degrees Fahrenheit
<i>Fed. Reg.</i>	<i>Federal Register</i>
FEIS	final environmental impact statement
FEMA	Federal Emergency Management Agency
FONSI	finding of no significant impact
ft	feet
FWS	U.S. Fish and Wildlife Service

Acronyms and Abbreviations

g	strength of earth's gravitational field (acceleration of 980 cm sec^{-2})
gal	gallon
GEIS	generic environmental impact statement
gpd	gallons per day

ACRONYMS AND ABBREVIATIONS (continued)

gpm	gallons per minute
Gy/day	gray per day
ha	hectare
HF	hypothetical flood
hp	horsepower
hr	hour
ISC	Industrial Source Complex
kg	kilogram
km	kilometer
km ²	square kilometer
kV	kilovolt
L	liter
LCF	latent cancer fatalities
LPG	liquid petroleum gas
L/min	liters per minute
LOEAL	lowest observed adverse effects level
LTSP	long-term surveillance plan
m	meter
m ²	square meter
m ³	cubic meter
m ³ /s	cubic meter per second
MCE	maximum credible earthquake
MCL	maximum concentration limit
MEI	maximally exposed individual
MeV	million electron volts
mg	milligram
mg/L	milligram per liter
Mgd	million gallons per day
ml	milliliter
min	minute
M _L	Richter magnitudes
MP	milepost
mph	miles per hour
mrem	millirem
mSv	milli-Sievert (100 millirems)
FCi	microcuries
μg	micrograms
NAAQS	National Ambient Air Quality Standards

Acronyms and Abbreviations

NAS	National Academy of Sciences
NCRP	National Council for Radiation Protection and Measurements
NEPA	National Environmental Policy Act of 1969
NESHAP	National Emission Standards for Hazardous Air Pollutants

ACRONYMS AND ABBREVIATIONS (continued)

ng	nanogram
ng/m ³	nanogram per cubic meter
NMSS	Office of Nuclear Material Safety and Safeguards
NO ₂	nitrogen dioxide
NOI	notice of intent
NOAEL	no observed adverse effects level
NPDES	National Pollutant Discharge Elimination System
NPS	National Park Service
NRC	U.S. Nuclear Regulatory Commission
O ₃	ozone
ORNL	Oak Ridge National Laboratory
ORNL/GJ	Oak Ridge National Laboratory, Grand Junction Office
Pb	lead
pCi/m ² /s	picocuries per square meter per second
pCi/g	picocuries per gram
PCPI	per capita personal income
pg/m ³	picogram per cubic meter
PGA	peak ground acceleration
pH	a measure of hydrogen ion concentration (acid/basic)
PM-10	particulate matter less than 10 microns in diameter
PMF	probable maximum flood
POC	point-of-compliance
ppm	parts per million
PSD	prevention of significant deterioration
Publ. L.	public law
s	second
SO ₂	sulfur dioxide
SPCC	spill prevention, control, and countermeasures
Sv	Sievert
TDS	total dissolved solids
TER	Technical Evaluation Report
TPI	total personal income
TSP	total suspended particles
UDNR	Utah Department of Natural Resources
UDOT	Utah Department of Transportation
UMTRCA	Uranium Mill Tailings Radiation Control Act of 1978
UMTRAP	Uranium Mill Tailings Radiation Control Act Program
USC	United States Code

Acronyms and Abbreviations

USGS	U.S. Geological Survey
VMT	vehicle miles traveled
V ₂ O ₅	vanadium oxide
WL	working level

ACRONYMS AND ABBREVIATIONS (continued)

yd ²	square yard
yd ³	cubic yard
yr	year

SUMMARY AND CONCLUSIONS

This Final Environmental Impact Statement (FEIS) has been prepared under the direction of the staff of the U.S. Nuclear Regulatory Commission (NRC) and issued by the Commission's Office of Nuclear Material Safety and Safeguards (NMSS). The National Park Service (NPS), U.S. Department of the Interior has been a cooperating agency in the preparation of this FEIS. In this role, the NPS provided information to the preparers of the FEIS, submitted comments on preliminary drafts of the report, and assisted in defining proposed sampling protocols for the collection of additional information on water quality and aquatic biota. The NPS does not necessarily agree with the analysis and conclusions in this FEIS.

1. This action is administrative, involving a licensing decision in response to a license amendment request from Atlas Corporation, Denver, Colorado. Atlas proposes to reclaim an existing uranium mill tailings pile on the Atlas site near Moab, Utah, and has requested NRC to amend its existing License No. SUA-917 to allow this proposed reclamation. The Atlas mill ceased operations in 1984 and has been dismantled except for one building. The stabilization of the 9.52-million-metric-ton (10.5-million-ton) uranium mill tailings pile for long-term disposal is evaluated in this FEIS. The proposed license amendment would allow Atlas to (1) reclaim the 52.6-ha (130-acre) tailings pile for permanent disposal and long-term custodial care by a government agency in its current location on the Moab site, and (2) prepare the 162-ha (400-acre) Moab site for site closure.

Under the Atlas proposal, the side slopes of the pile would be reduced to 30 percent [i.e., 0.9 m (3 ft) vertical per 3 m (10 ft) horizontal] or less to minimize effects of erosion and possible earthquakes. Also, an earth and rock cover system would be installed over the pile and around its sides and base to minimize radon escape, infiltration of rain water into the tailings, infiltration of tailings contaminants into groundwater, and tailings erosion potentially caused by surface runoff and flooding of the Colorado River and a nearby ephemeral stream known as Moab Wash. Earth and cover materials would likely be obtained from several borrow sites, including a site for crushed bedrock near Potash to the southwest of the Atlas site, an area for rounded cobble in Spanish Valley southeast of Moab, and an area for clay on Klondike Flat northwest of Moab near the Canyonlands Airport.

Alternatives considered in this FEIS include (1) moving the tailings by rail for disposal at the Plateau site, about 29 km (18 miles) northwest of Moab; (2) the no-action alternative under which Atlas would cease all operations involving environmental control of the

tailings and NRC would make no licensing decision; (3) alternative modes of tailings transport, including conventional truck, off-road truck and private haul road, and slurry pipeline; and (4) other alternative disposal sites, including the Box Canyon site, the Rio Algom site, the Envirocare site, and the Emery County Development Corporation site. The FEIS compares the Atlas proposal with an alternative of tailings disposal at the Plateau site, which was identified during scoping as one of the best alternate sites identified to date. Because the no-action alternative would not comply with NRC and other environmental regulations and would not be environmentally acceptable, it is not analyzed in detail.

2. A Draft Environmental Impact Statement (DEIS) was published and made available for public and agency review and comment in January 1996. A public meeting to receive comments on the DEIS was held in Moab on February 28, 1996. The comment period closed on April 29, 1996. Comments received have been reviewed by NRC staff and revisions have been made in this FEIS in response to comments. On March 7, 1997, NRC made available the final Technical Evaluation Report (TER) that evaluates the technical adequacy of Atlas's proposed design for tailings pile reclamation. The final TER evaluates engineering aspects of the Atlas proposal and its compliance with Appendix A to 10 CFR Part 40, whereas this FEIS focuses on the analysis of environmental impacts. The draft TER was made available for public comment along with the DEIS, and responses to public comment on the draft TER are provided in Appendix A of the final TER.
3. In compliance with consultation requirements of Section 7 of the Endangered Species Act, NRC submitted a Biological Assessment (BA) on potential impacts to endangered and threatened species to the U.S. Fish and Wildlife Service (FWS) on November 1, 1995. In response to FWS' review of the BA and their concerns about the need for additional information, a Supplement to the BA was prepared and submitted to the FWS in January 1997. After extensive discussions and reviews of drafts of the Biological Opinion, the FWS submitted their Final Biological Opinion to NRC on July 29, 1998. The Biological Opinion specified reasonable and prudent alternatives and measures to avoid jeopardizing the continued existence of endangered species in the vicinity of the Atlas site and to minimize incidental take, as defined in the Final Biological Opinion.
4. Major concerns raised during scoping are summarized in Section 1.5 of this FEIS. Public and agency comments on the DEIS are summarized and responses are provided in Appendix A of this FEIS. The major categories of concern were that:
 - a. Reclamation of tailings should provide maximum protection of public health and the environment and should be consistent with NRC policy and regulations and prior NRC actions involving tailings reclamation.

- b. The NRC review is fragmented and NRC needs to evaluate the groundwater corrective action plan in the EIS.
 - c. The level of information on the chemical and physical composition of the tailings is limited, and more data should be collected.
 - d. Over the long term, earthquakes, subsidence, landslides, and the frequent flushing of the tailings base by flood waters could compromise pile stability.
 - e. A failure of the tailings pile would contaminate the Colorado River, resulting in impacts on the environment and downstream water users.
 - f. Tailings leachates entering the groundwater and the Colorado River would have an adverse impact on water quality and aquatic biota, including endangered and threatened species;
 - g. The tailings pile would impact recreation, tourism, and the local economy.
 - h. The environmental impact statement (EIS) should provide a comprehensive technical and cost-benefit analysis of alternatives, including the use of the best and most recent information.
 - i. Extraction and transport of borrow materials for the proposed reclamation at the Atlas site would adversely affect residents near the borrow areas and traffic in Moab and along the transportation routes.
 - j. Reclamation of the pile in place would preclude future use of at least half the Atlas site.
 - k. Moving the pile to the Plateau site would largely eliminate future risks of contaminants affecting human health and ecological resources and would allow future commercial use of the Atlas site.
5. The assessment of potential environmental consequences of the Atlas proposal and the Plateau site alternative is based on existing information provided by the licensee, state and Federal government agencies, literature searches, personal communications, and observations made by NRC staff on several site visits. Although considerable concern about the adequacy of data was made during the DEIS comment period, NRC has thoroughly reviewed the available data, incorporated new information that has become available since publication of the DEIS, and concluded that sufficient information is available to evaluate environmental impacts of the proposed action and alternatives.

The following summary of impacts includes consideration of a hypothetical, maximum tailings pile failure in which 20 percent of the tailings pile enters the Colorado River during a hypothetical flood. However, staff do not expect the tailings pile to fail because it would be designed to withstand earthquake and flooding conditions anticipated at the Atlas site.

- a. Fugitive dust and vehicle emissions would add to existing levels of air pollutants in the region, which are in compliance with national ambient air quality standards (NAAQS). Fugitive dust during reclamation under either alternative would not be expected to cause exceedances of NAAQS, although more dust, vehicle emissions, and noise would result from moving the pile than reclaiming it in place. No other source of air pollutants has been identified that would cause a significant impact in combination with the Atlas proposal or the Plateau site alternative. Long-term releases of air pollutants after reclamation at either the Atlas site or Plateau site would be very small, would most likely be less than those presently occurring at the Atlas site, and would not cause exceedance of air quality standards.
- b. No long-term land use change would result from the Atlas proposal. Because the tailings pile would continue to occupy a portion of the Atlas site under the Atlas proposal, future use of roughly half of the site for other purposes would be precluded. Under the Plateau site alternative, unrestricted use of the entire Atlas site could occur after completion of reclamation and groundwater cleanup, but the time required to clean up groundwater is unknown at this time. The Plateau site alternative would result in the loss of a few hundred acres of grazing land, which represents a very small fraction of the extensive similar lands available for grazing in the region. Deposition of tailings onto downstream lands after a hypothetical tailings pile failure and flood would add to any existing level of contamination resulting from past deposition of contaminants in the river from all upstream sources during previous floods. In the event of such a hypothetical pile failure and flood, the long-term custodian of the site (i.e., DOE or the State of Utah) would be responsible for monitoring potentially affected areas and undertaking any needed cleanup. Staff considers the proposed design that was reviewed and accepted in the final TER to be sufficient to withstand the extreme conditions considered in the FEIS analysis. Therefore, staff concludes that there should be no appreciable long-term impact on land uses along the river.
- c. The use of water during reclamation under the Atlas proposal or the Plateau site alternative should be minimal under Atlas' existing water rights. Potable water would be supplied from the Moab water system and could cause a slight increase in the total groundwater use in the Moab area. Water for control of fugitive dust and other reclamation purposes could be withdrawn from the Colorado River under Atlas' senior water rights. Under the Plateau site alternative, tailings leachates would no longer enter the alluvial aquifer at the Atlas site, but the contamination of the groundwater that has already occurred would persist for an unknown period of time. No impact to groundwater at the Plateau site would be anticipated, because the clay underlying the disposal cell would act as a clay liner to prevent leaching of contaminants, and no

viable supply of groundwater has been identified there. No water use would occur for the Atlas proposal or the Plateau site alternative after reclamation is completed.

- d. Any hydrological impact associated with the tailings reclamation at the Atlas site or the Plateau site would be negligible. About 0.2 ha (0.5 acres) of 100-year floodplain would be lost at the mouth of Moab Wash as a result of its reconfiguration (see discussion in h. below). Atlas must determine if a permit from the U.S. Corps of Engineers would be required for conducting reclamation activities in the floodplain. Most floodplain in the immediate area has been protected from development by the establishment of the Scott Matheson Wetlands Preserve immediately across the river from the Atlas site. No floodplain is present at the Plateau site.
- e. Impacts on surface water quality would be reduced from the existing situation by reclamation of the pile under either alternative. During reclamation-associated activities, surface runoff associated with both alternatives could temporarily add to existing levels of impacts on surface water quality in the Colorado River. With adequate controls, this cumulative, temporary impact would be expected to be negligible. After reclamation under the Atlas proposal, tailings leachates would continue to enter the Colorado River at a reduced rate and, given effective implementation of appropriate measures and controls, would have a small, generally undetectable impact on surface water quality. The greatest potential for impact would occur during periods of low flow in the river when the tailings contribution to flow would be fractionally larger than during high flows. Existing data indicate that manganese, molybdenum, ammonia, and uranium increase downstream of the pile. Of these, ammonia has been identified by FWS as the principal concern for aquatic life.

At the Plateau site, the clay layer beneath the tailings and the underlying Mancos Shale would restrict the escape of tailings leachates, thus preventing impacts to a nearby ephemeral wash and the Colorado River, which is far downstream. The hypothetical tailings pile failure at the Atlas site would have a relatively large, short-term impact (e.g., several weeks) and a small, long-term impact on water quality, which would likely be undetectable after a short time period (e.g., months to several years) after the failure. Over the long term, most tailings contaminants would represent a small fraction of the large amount of existing contaminants continually transported by the river.

- f. Aquatic biota in the Colorado River would be affected by any changes in surface water quality resulting from the Atlas proposal or the Plateau site alternative. Under existing conditions, only ammonia has been shown to occur at levels potentially toxic to aquatic life within the mixing zone. The ammonia levels in and near the interface where

groundwater discharges into the river may be sufficiently high to be toxic to organisms residing in or near the substrate. Based on the analysis presented in Section 4.5.2.4 and the data in Table 4.6-1, even at record low flow, contaminant concentrations beyond the mixing zone are well below both state water quality standards and toxicity benchmarks with the exception of ammonia and gross alpha. Under the Atlas proposal, and without implementation of effective measures to reduce ammonia discharge to the river, potentially toxic concentrations of ammonia could continue to be released, but the extent of the affected area (i.e., the mixing zone) would be smaller. The FWS sets forth in its Final Biological Opinion as a reasonable and prudent alternative, requirements for limiting ammonia levels discharged into the Colorado River to concentrations safe for endangered fish populations within the next few years (see discussion in g. below). A clear determination cannot be made that all ammonia standards identified by FWS can be met, because of uncertainties imposed by incomplete site data. Staff will require the applicant to perform additional site measurements and a rigorous analysis to determine whether the proposed action will meet the acute and chronic ammonia limits, as identified by FWS.

During reclamation operations, erosion control measures would be applied to prevent the occurrence of appreciable impact. After reclamation under the Atlas proposal, tailings leachates would continue to add slightly to existing contaminants in the river, potentially having a minor impact on aquatic biota within the much reduced mixing zone, but groundwater would have to be cleaned up to appropriate standards. The Plateau site alternative would eventually reduce the potential for impact on aquatic biota once groundwater cleanup to applicable standards is achieved, although the time and amount of cleanup required is unknown at this time. The hypothetical tailings pile failure would have immediate, but rather short-term impacts on water quality and aquatic biota.

- g. Threatened and endangered species could be affected by the proposed reclamation. Consultation with the U.S. Fish and Wildlife Service (FWS) under Section 7 of the Endangered Species Act resulted in a Final Biological Opinion concluding that the proposed reclamation would jeopardize the continued existence of four endangered fish species. To avoid jeopardy, the FWS developed reasonable and prudent alternatives that require development and implementation of an expedited groundwater corrective action program to reduce the release of contaminants into the Colorado River via the groundwater pathway to meet state and federal standards within seven years. In addition, the Final Biological Opinion requires reasonable and prudent measures to minimize the incidental take of southwestern willow flycatcher, razorback sucker, and Colorado squawfish. NRC will include the terms and conditions specified

in the Final Biological Opinion as conditions of the license amendment for the proposed reclamation, should it be approved.

- h. Atlas' proposed reclamation would disturb or destroy about 0.2 ha (0.5 acre) of floodplain habitat at the Atlas site, but a similar amount of equivalent or superior habitat would be created to compensate for the loss. Terrestrial habitats at borrow areas would be temporarily disturbed. A portion of the floodplain habitat that would be disturbed on the Atlas site is tamarisk wetland, which is of limited importance to wetland wildlife but may be used by the southwestern willow flycatcher. Under the Plateau site alternative, the loss of a few hundred acres of sparse vegetation at Klondike Flat that supports low numbers of wildlife would occur from construction of a new disposal cell. No threatened or endangered plant or animal is likely to be affected under the Plateau site alternative. Under the proposed action, no reduction in habitat or wildlife populations numbers would be anticipated in the event of the hypothetical tailings pile failure.
- i. Reclamation of the tailings pile at either the existing Atlas site or the Plateau site would result in a slight, short-term increase in employment and population in the Moab area. This increase could add slightly to the effects of the increased population in the area during the primary tourist season. However, the Moab area should be able to absorb the increased population with no significant adverse impact. No impact on historic or cultural resources is anticipated under either alternative. The transport of borrow material by truck would add to existing traffic, have some adverse and beneficial impacts on business in Moab, and increase the potential for traffic accidents. Under the Plateau site alternative, the 7 to 12 years of moving the tailings pile and contaminated soils by rail could create a temporary adverse aesthetic impact. Because truck transport of borrow materials (Atlas proposal) and borrow material and mill debris (Plateau site alternative) in the Moab area would occur only for a limited time (1 to 2 years) and would be conducted primarily during the winter season, truck traffic associated with either the Atlas proposal or the Plateau site alternative would not be expected to produce a significant impact on traffic in Moab and along the transport routes. The hypothetical tailings pile failure could cause some temporary economic impact. Because impacts on water quality would be limited, tailings pile failure would not be expected to produce a significant economic impact related to surface water use.
- j. Doses to the maximally exposed individual (a resident adjacent to the Atlas site) and to the surrounding population were estimated based on computer modeling results and on actual measurements at the Atlas tailings pile and at other tailings piles. Impacts during reclamation of the tailings pile would be dominated by radon progeny (86 percent) rather than particulates (14%). After reclamation, essentially no release of radioactive

- particulates would occur, and radon releases would be reduced to less than the NRC limit of 0.74 Bq/m²/s (20 pCi/m²/s). Dose to the maximally exposed individual from particulates and radon progeny during reclamation would be an estimated 0.78 mSv/yr (78 mrem/yr), which is below the NRC limit of 1 mSv/yr (100 mrem/yr). During reclamation, the total annual dose to the Moab population would be less than 0.052 person Sv (5.2 person rem) compared to a total natural background dose of about 18 person Sv (1800 person rem). After reclamation the doses to the maximally exposed individual and the Moab population would be 0.02 mSv/yr (2.0 mrem/yr) and 8×10^{-4} person Sv per year (0.08 person rem per year), respectively. Under expected working conditions, doses to reclamation workers on the tailings pile would be expected to be less than 0.01 Sv/yr (1 rem/yr). For the Plateau site alternative, annual doses during removal of the tailings would be about the same as the reclamation doses for the Atlas proposal, but the doses would last up to 7 years longer. A risk analysis conducted for transport of the tailings by rail to the Plateau site indicated that no acute fatalities would occur and that the number of latent cancer fatalities would not exceed 6.44×10^{15} for the railroad crew or 1.50×10^{14} for the general public.
- k. The analysis of costs and benefits associated with reclamation alternatives indicates that the proposed Atlas reclamation-in-place would cost significantly less (\$16 to \$19 million) than moving the pile to the Plateau site (\$72 to \$103 million). Both options could result in benefits from releasing land at the Atlas site for unrestricted use, but more land is likely to be available eventually for future uses under the Plateau site alternative, recognizing the uncertainty of the groundwater cleanup program.
6. Based on the evaluations in this FEIS, if NRC approves a license amendment to reclaim the tailings on the Atlas site, the licensee will be required to conform to the following conditions in addition to the requirements in the final TER (NRC 1997), permit conditions required by the State of Utah and other regulatory agencies, and requirements specified in the FWS' Final Biological Opinion:
- a. A plan to minimize emissions of fugitive dust during reclamation shall be submitted for NRC approval (Section 4.1.7).
 - b. A spill prevention and control plan and an erosion control plan applicable to the Atlas site and borrow areas shall be submitted for NRC approval (Section 4.5.2.6).
 - c. Interception and storage of sediment- and contaminant-laden runoff through use of adequate drainage control, retention and treatment ponds, silt fences, and other means as necessary (Section 4.5.2.6).
 - d. Avoidance of major earthmoving operations (such as the relocation of Moab Wash) during periods of high thunderstorm potential where and when feasible (Section 4.5.2.6).

- e. Avoidance of siting potential borrow areas immediately adjacent to streams (Section 4.5.2.6).
 - f. Implementation of the reasonable and prudent alternatives and measures specified in the Final Biological Opinion to avoid jeopardy to endangered species and their critical habitat (Appendix C).
 - g. An analysis, supported by additional site measurements, to show that the proposed action will result in meeting the acute and chronic ammonia limits in the Colorado River, as identified in the Final Biological Opinion (Section 4.5.2.4).
 - h. A survey by a qualified botanist to determine if Jones cycladenia is present in the vicinity of the proposed Kane Creek quarry site before any activities are initiated at the site. If the species is present, the licensee would be required to develop appropriate mitigative measures in consultation with the FWS to ensure that populations are protected from disturbance (Section 4.6.4.1).
 - i. Limitations on the use of the Potash quarry site to the December through February period to avoid impacting recreational use of the Potash boat ramp (Section 4.7.3.2).
 - j. Topographic and vegetative restoration of borrow areas as required by the State of Utah Division of Oil, Gas and Coal Mining (Section 4.5.2.6 and 4.7.4.3).
 - k. A borrow transport plan shall be submitted for NRC approval to minimize impacts on socioeconomics and recreation (Section 4.7.1.6 and 4.7.5.6).
7. On the basis of its independent review and evaluations, the NRC staff concludes that the Atlas proposal (i.e., reclamation for permanent disposal of the mill tailings on the Atlas site in Moab), with the conditions identified in item 6, is acceptable with respect to environmental costs and benefits, and, therefore, the staff recommends that Atlas' request for a license amendment to proceed with the on-site reclamation be approved.